1470 **WHAT IS CLAIMED IS:**

1. A means for the implementation of new fast algorithms for complex Walsh orthogonal CDMA encoding and decoding of multiple data rate users over a CDMA frequency band with properties

1475   provide a complex Walsh orthogonal code with the real component equal to the real Walsh orthogonal code, and with the imaginary component equal to a reordering of the real Walsh orthogonal code which makes the complex Walsh orthogonal code the correct complex version of the real Walsh orthogonal code to

1480 within arbitrary angle rotations and scale factors

    provide complex Walsh orthogonal CDMA codes which reduce to the real Walsh orthogonal CDMA codes upon removal of the imaginary code components

    provide a means to encode and decode multiple data rate

1485 users with complex Walsh orthogonal codes for simultaneous transmission over the same CDMA frequency band with computationally efficient algorithm means to implement the encoding and decoding

    provide a computationally efficient algorithm mmeans to

1490 encode and decode multiple data rate users with complex Walsh orthogonal codes with values +/-1 +/-j, for simultaneous transmission over the same CDMA frequency band

2. A means for the implementation of new hybrid complex Walsh orthogonal CDMA encoding and decoding of multiple data rate

1495 users over a CDMA frequency band with properties

    provide a means for the construction of hybrid complex Walsh orthogonal CDMA codes which are functional combinations of the complex Walsh, discrete Fourier transform (DFT), Hadamard (real Walsh), and other orthogonal codes and which offer wider

1500 choices of code lengths

    provide a means to extend the complex Walsh orthogonal CDMA codes to include the complex discrete Fourier transform (DFT) codes and other orthogonal codes to allow greater flexibility in the choices for the code lengths

1505   provide new fast algorithm means for the encoding and decoding of hybrid complex Walsh codes for multiple data rate users

3. A means for the design of hybrid complex Walsh orthogonal CDMA encoding and decoding of multiple data rate users
1510   over a CDMA frequency band with properties

provide a means to provide greater flexibility in the selection of the code length by combining the complex Walsh orthogonal CDMA codes with the complex DFT orthogonal CDMA codes as well as with other orthogonal codes

1515   provide a Kronecker product means to combine the complex Walsh orthogonal CDMA codes with complex DFT orthogonal CDMA codes as well as with other orthogonal CDMA codes

provide a direct sum means to combine the complex Walsh orthogonal CDMA codes with complex DFT orthogonal CDMA codes as
1520   well as with other orthogonal CDMA codes

provide a functionality means to combine the complex Walsh orthogonal CDMA codes with complex DFT orthogonal CDMA codes as well as with other orthogonal CDMA codes

provide new fast algorithm means for the encoding and
1525   decoding of hybrid complex Walsh codes for multiple data rate users

4. A means to provide unconstrained flexibility in the selection of the code length by functional combining of appropriate orthogonal CDMA codes drawn from a set of code
1530   candidates that include the complex Walsh and the complex DFT

provide a functional means for the generation of orthogonal CDMA codes with unconstrained flexibility in the selection of the code length

provide a fast algorithm means for the encoding and
1535   decoding of CDMA codes designed with a functional means for the generation of orthogonal CDMA codes with unconstrained flexibility in the selection of the code length

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provide a functional means for the generation of orthogonal CDMA codes for multiple data rate users with unconstrained

1540   flexibility in the selection of the code length

provide a fast algorithm means for multiple data rate encoding and decoding of orthogonal CDMA codes which are generated by a functional means for multiple data rate users to provide unconstrained flexibility in the selection of the code

1545   length

1550   **REFERENCES:**

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.560   Applications", Academic Press 1975

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